KNOW THE PLANTS AROUND YOU

An ERIC PROJECT

By

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KNOW THE PLANTS AROUND YOU

In the context of improving the educational structure from the primary stage, the present thinking is - "not to stuff the mind of children with facts and informations, but to sharpen their senses to enable them to observe their ENVIRONMENT and to enrich their experience".

The concept of ENVIRONMENTAL EDUCATION in the present title is of recent origin. But its roots extend back to the time immemorial. Early man realised the existence of a BIOSPHERE and identified himself with it. Vedic hymns, Biblical references, early writings, religious customs, myths and traditions bear testimony to this. Philosophies and views of the ancient Hindu Cultures are reflected in old Sanskrit Scripts of Rigveda. One of the most significant verses is cited here:

"The plants conceived him as timely fetus. The waters as his mothers created Agni. Trees and plants are evenly pregnant with him and bring him form at all times" (Rigveda - Samhita, song 10-91; An Agni verse 6; Circa 3000 B.C.)

This verse tells us that plants were regarded as entities on the same level as water, sky, mountains,

oceans and so forth. Plants were held as transitory manifestations between water and Agni (the God of fire). This philosophy is very reasonable for people living in a monsoon climate who experience annual brush fires in forests.

Man's awareness of the universal Environmental crisis has led to the importance of 'Environmental Education'. Despite one's clear understanding about the concept, Environmental Education is gaining importance for entry into the school curriculum. Some components of the EE are already in our school curriculum under various disciplines viz. "Nature study", "Field study", "Geography", "History", "Science" etc. In short EE is a multidisciplinary, broad based "approach" which demands value clarification, self awareness, environmental awareness, citizenship responsibility and cultivation of ethics towards the environment.

The teachers would play the key role in bringing in the desirable attitudinal changes among the future citizens. 'Value clarification' and 'self awareness' can be cultivated among children through teaching of History, Literature, Cultural heritage etc. Living and learning through environment is a spontaneous exercise to any child. A good and intelligent teacher's job is to apply a method of teaching which would appeal to the child instantly.

To teach about a part of Natural Environment - trees and plants - in the course of time as the child grows, its curiosity need be drawn towards the beneficial aspects of them. We love the greenery created by plants, the nourishment and protection given by them to the humanity in general are also appreciated. What catastrophe we are facing in India by reckless denudation of forests is reminded to us during the floods every year.

The protective and curative factors of herbs and plants are also well known. All those characteristics need be taught to the children one after another to make them conversant with the figts of nature as we receive from trees and plants.

There are certain species of trees and plants which are traditionally given more importance than the rest. Why is this so? Around certain species many myths are there for ages. How have they come about? Are these so because they have been more beneficial to man as individuals or community wise? These could be found out through research to be conducted by the students of sciences and society combinedly.

In an attempt to promote the ideas discussed above the Project "Know the Plants Around You" was taken up under ERIC (Educational Research & Innovations Committee) NCERT, New Delhi.

A new approach/methodology is followed here in teaching about the plants. A specimen copy of the treatise on plants is enclosed for ready reference. It may be noted that it begins with stories & myths associated with the plants, then comes the usefulness of the plant and the technical Taxonomical aspect has been dealt with at the end.

WORK DONE

1. **Plant list:**

To start with very common plants associated with our every day life were chosen and an alphabetical list consisting about 70 plants was prepared. (List enclosed).

2. **A handy key:**

A teacher essentially needs knowledge about the correct systematic position of a particular plant. This is important because the commercial use of a plant whether in medicine, in agriculture or in any other purpose depends upon its correct identification. Further, it has been observed that teachers and students alike find it difficult to quickly recognise a plant in the field. So availability of a handy key with floral diagram was felt necessary and it has been prepared.

The first part consists of a key to the families of plants. Once the family is identified it become easier to go for the genus and then finally to the species of the plants.

3. **How to describe a flowering plant:**

Long standing class room teaching experience has shown us that students need a standard method of describing plants in technical terms. So a model data sheet has been prepared for the hand book.

4. A typical plant description in the new method:

i) Each plant starts with its local name in different Indian languages viz. Assamese, Bengali, Hindi, Oriya, Sanskrit, Tamil, Telgu and so on. Then the plant is introduced through stories about it to make the subject interesting to the child. If we search our literature and scriptures we find that lots of interesting stories are associated with plants. A child actively participates in teaching if the topic is introduced through interesting stories, this is our age old experience. As part of 'Environmental Education' the Indian child should also be exposed to our wealth of mythological stories, fairy tales and tales, from old scriptures. From ancient time man has lived with plants and so many stoties are available in literature focussing/ highlighting its intimate association with man. These stories also bring forth the importance of a particular plant to the human society; with this idea the plant is introduced to the child.

ii) History and Origin

Next, a short history and origin of the plant is discussed both from the technical and non-technical point of view.

iii) Uses:

Then comes the short description about the uses of the plant as food, fodder clothing, medicine, building material, essential oils, and other commercial commodities.

iv) Botanical aspects:

The botanical aspect and the technical description of the plant has been purposely kept towards the end in order not to load the child's mind with certain raw data. The technical description starts with classification or systematics of the plant. Next comes the distribution of the plant on the surface of the Earth which is known as the Plant Geography. Plant geography is an interesting subject if the teacher teachs it with world map; this gives an idea how plant species have migrated from place to place and how and why some plants are restricted in their distributions while others are cosmopolitan. Such treatments help expanding the mental horizon of a child. Then begins the technical descriptions, of a plant following strictly the data sheet prepared for this purpose. The technical description includes the following aspects

of the plants: *habitat* and *habit*, *root*, *stem*, *phyllotaxy*, *leaf*, *inflorescence*, *flower* and its parts *fruit*, *seed* and lastly the floral diagram and *floral formula* of the particular plant species described.

5. Herbaria:

Dried and preserved plant specimens are important teaching aids for a teacher in plant science. So special care was taken to prepare a rich herbarium of the common plants particularly those whose narrations are given in the text. The list of herbaria prepared is also enclosed. These herbaria are kept at two locations (1) Regional College of Education, Bhubaneswar, Life Sciences Laboratory. (2) Department of Education in Science and Mathematics, NCERT, Biology Laboratory. A special steel almirah was made to order where the herbaria were kept in Regional College of Education, Bhubaneswar as the project orignated there.

6. Publications:

The following two publications were made during the tenure of this project for the dissemination of our experimental idea to the school teachers. The first publication was made in 1981 in the journal *Vigyan Shikhak* (Bengali, published by the All India Science Teacher Association (West Bengal branch). The article

was on Butea monosperma under the joint authorship of Ms. Kuntala Basu, Research Assistant, Dr.(Mrs) Gouri Rani Ghosh, Project Director and Dr. Madhuri Roy, Head, Department of Bethun College and Coinvestigator in the Project. Second publication was in School Science published by NCERT. The plant delt with was Vol.XX No.1, March 1982 . The Royal Water Library Victoria regia under the joint authorship of Mr. Suraj Joshi and Dr.(Mrs.) Gouri Rani Ghosh and D. Rant, Research Scholar.

References:

In order to help the teacher every plant description is provided with a short list of concerned references at the end. Two sample plant descriptions are enclosed for reference.

METHODS OF DESCRIBING A FLOWERING PLANT
(AN OUT LINE)

ROOT:
Tap or adventitious (1)
Branched or unbranched (2)
Special forms (3)

STEM:
Position (1)
Nature (2)
Mode of growth (3)
Modification (4)
Branching (5)
Solid or hollow (6)
Node (7)
Hairy (8)
Bark (9)
Special characters (10)
(thorns etc.)

LEAF:
Ecchabit
Position
Phyllotaxy
Base (1)
Sessile or Petiolate (2)
Simple or compound (3)
Shape (4)
Margin (5)
Apex (6)
Surface (7)
Venation (8)
Other particulars (9)

INFLORESCENCE: Racemose, Cymose or mixed (1)
Kind (2)
Axis character (3)

FLOWER: Sessile or pedicillate (1)
Bract (2)
Complete or incomplete (3)
Hermaphrodite or unisexual (4)
Actinomorphic or zygomorphic (5)
Floral parts, arrangement (6)
disc
General character florets (7)
ray
Gynaecium (8)

CALYX: Sepal
Color (1)
Shape (2)
Number (3)
Position (4)
Aestivation (5)
Poly or gamo (6)
Out line (7)

Corolla: Petal
Number (1)
Shape (2)
Out line (3)
Poly or gamo (4)
Type (5)
Color (6)
Position (7)
Aestivation (8)

PERIANTH:

Members Poly or gamophyllous (1)

Number (2)

Shape (3)

Out line (4)

Color (5)

Aestivation (6)

ANDROECIUM: Anthers

Number (1)

Condition (2)

Arrangement (3)

Attachment (4)

Anther fixation (5)

Filament (6)

Colour (7)

Dehiscence (8)

GYNAECIUM: Carpels

Number (1)

Apocarpous or Syncarpous [2)

Position of ovary (3)

Number of cells (4)

Placentation; axile, parietal, marginal or free central (5)

Nature and form of stigma (6)

Other special characters (7)

FRUIT: Simple, compound or aggregate

Dehiscence of the fruits, if dry.

Types and anatomy of the fleshy fruit.

METHOD OF DESCRIBING A FLOWERING PLANT

HERBITAT: The natural locality; cultivated, ornamental or food crop or wild.

HABIT: Annual, biennial or perennial. Herb Shrub or tree or any other ecohabit viz; parasite, hydrophyte, mesophyte xerophyte or carnivorous.

ROOT: Tap or adventitious branched or unbranched. Any special form such as tuberous, nodulated, fibrous, conical, fusiform, napiform, parasite aerial epiphyte etc.

STEM: Aerial or underground, erect, prostrate or climbing, turning. If climbing, the mode of climbing whether by tendril, spine, hook or by any other means? Any special modification such as rhizome, corm, bulb, tuber, phylloclade, runner or sucker. Herbaceous or woody. Any other colour, other than green. Branched or unbranched; if branched: mode of branching, racemose or cymose. If cymose: uniparous, biparous or multiparous. If herbaceous: solid, hollow (fistula) or jointed. If woody; surface characters of the bark: hairy glabrous, waxy or spiny? Shake: cylindrical angular, compressed or reduced.

LEAF: Size: use metric system for sizes.

Phyllotaxy - Alternate or opposit (superposed or decussate) whorled or mosaic.

Habit: Deciduous, ever green, radical, cauline or ramal. Exstipulate or stipulate; the stipules be described.

Sessile or Pedicillale - Leaf base: sheathing, connate, perfoliate ligulate etc. , simple or compound.

Shape: Linear, oval etc; pinnatifid or palmatifid. If incised, outline of the lobes, partitions or segments be indicated. Nature of the *margin*, *apex*, *surface*; glabrous, hairy, glandular etc. and *Venation*: Unicostate pinnate or multicostate pinnate, reticulate or parallel be described.

If *compound*, whether pinnate or palmate. If *pinnate*; paripinnate or imparipinnate. Number and arrangement of the leaf lets. Leaflets sessile or stalked, outline, *venation*, *margin*, *apex* and *surface*? If *palmate*: uni, bi tri or multi foliate;

INFLORESCENE: Racemose, cymose or mixed? Character of axis: elongated, conical flattened, concave, solid, hallow etc.

FLOWERS: Sessile or pedicilliate? Bracteate or ebracteate; bracteolate or ebrateolate (if bracteate bracts should be described) complete or incomplete, bisexual or unisexual.

Actionmorphic, zygomorphic or irregular; cyclic, hemicyclic or a pherical; any other general character. Colour of the flower. Position of the ovary: hypogynous, epigynous or perigynous, homochlamydeous or heterochlamydeous, pentamerous, tetra or trimerous.

If the flowers are of two kinds after giving common characters both should be described separately. In compositâte family, ray and disc florets should be described separately.

PERIANTH, OR CALYX:

Calyx: Number of sepals, colour, poly or gamo sepalous. If poly, number, shape, outline and apex should be described. If gamo form of sepals viz. tubular, companulate, bilabiate, spurred and nature of incision should be mentioned. Green or petaloid; inferrior or superior.

Aestivation: Valvate, twisted imbricate (descending or ascending) or quincuntial.

COROLLA: Number of petals, poly or gamo; if poly then shape, outline, apex be mentioned. If it is of any special form: papilionaceous, cruciform, caryophyllaceous and rosaceous. If gamo, describe the special form viz. tubular, campanulate, bilabiate or spurred. Corona or other special features should also be described. Aestivation of petals be mentioned.

PERIANTH: If perianth is present describe as above only use terms poly and gamophyllous.

Androescium:

Number of the stamens definite or indifinite, polyandrous, syngenesious or adelphous, or synandrous if anthers are united. If polyandrous, write special arrangements as didynamous, tetra dynamous etc. If adelphous: mono, di or poly adelphous; whether epipetalous or free from petals; hypo, peri or epigynous? Nature of the filments whether long, short or flattened? Anthers introrse or extrose? Colour, fixation and dehiscence of anthers, colour of the pollen.

GYNOECIUM:

Number of carpels: mono, bi, tri or polycarpellary apo or syncarpous? Ovary superior or inferior. Number of loculi or chambers in the ovary. Number of ovules in each loculus. Shape of ovule. Placentation: marginal, axile, parietal, basal, free central. Nature and form of the style and stigma. Nectar secreating disc, if present should be described.

FRUIT: Kind of fruit: Simple, compound or aggregate. Dehiscence of the fruit, if dry; types and auatomy of flishy fruits.

SEED: Endospermic or nonendospermic, position and shape of embryo, cotyledons straight, folded etc. Mono or dicotyledous.

GERMINATION: Epigeal or hypogeal.

NECTARIES: They may be described in connection with corolla stamen and pistil.

FLORAL FORMULA:

&

FLORAL DIAGRAM:

AEGLE MARMELOS

Genus : Aegle marmelos

Eng. Wood apple, A. Bael,B. Bael, H. Bel
O. Bela San - Bilva, Sriphal.

Origin & History

The Aegle marmelos, a much branched tree of the family Rutaceae is indigenous to and cultivated throughout the plains of India for its fruits and leaves. The tree is held in great veneration by the Hindus. It is sacred to Lord Siva whose worship can not be accomplished without the offerings of the leaves of this plant. Its leaves are ternate and hence it is locally famous as "Tripatri". According to Hindus mythology the three leaf-lets represent Lords Brahma, Vishnu and Siva. Some Hindus also consider it as a symbolic "Trident" of Lord Siva. A popular mythological story narrating the religious orgin of the plant as presented in Siva Purana is as follows: Once Lord Vishnu advised Godess Lakhsmi to worship Lord Siva. Accordingly, Lakhsmi worshiped with flowers of lotus so favourite to Lord Siva. On the final day of the worship she took one hundred lotus flowers to the temple and during worship placed one by one on the head of the Lord Siva. In the meantime Siva wanted to ascertain the devotion of Godess Lakhsmi and his two flowers out of the total lot. As a result of which Lakhsmi Devi found two flowers short at the end.

At that time she had neither any servant nearby to get the flowers nor she was in a position to leave the alter as it was a sin. She could not reach a point. Finally she recollected that Lord Vishnu once had compared her breasts with lotus for beauty and decided to offer her breasts to Lord Siva in place of two missing flowers. At first with a sharp knife she plucked her left breast and placed it on the Lord's head with pleasure. Seeing this act of Devotion the Lord became over pleased and appeared in his original form before her. He granted a boon to her by virtue of which she regained her lost breast. At the same time he wished that the breast that Godess Lakhsmi placed on his head should appear as 'Bilva' plant which will be most favourite to Lord Siva.

Another myth that signifies the medicinal and religious aspect of the plant is retold as follows: The Gods and demons had once decided to churn the ocean to get immortal nectar out of it. Accordingly a huge mountain was used as a pestle and the Vasuki (the king of snakes) as a great rope. Amongst the variety of products that came out of the churned ocean were also the two pots one containing nectar and the other poison. The God's tricked the demons and consumed the entire nectar. They expected the demons to be foolish enough to drink the poison and thus get rid of their cruelity for ever. But sensing the danger, the demons refused to take the poison and approached Lord Siva for justice. To settle the

issue and to save the universe from the deadly effect of poison Lord Siva gulped all the poison. The poison was so powerful that his entire body turned blue and He fell unconcious. Greatly worried, all the Gods tried different types of plants and their parts so as to save Lord Siva. Surprisingly no other plant except "Bilva patri" could recover Him and immediately got up in the original colour. Only the neck portion remained blue and since then Lord Siva is also called by the name of "Nilakanth" and the "Bilva leaf" gained religious importance.

Botanical characters:

Systematic Position

Taxonomy - Division : Angiosperms
Class : Dicotyledons
Sub-class : Polypetalae
Series : Disciflorae
Order : Geraniales
Family : Rutaceae

STEM: Woody tree with dichotomous branching.

LEAVES: Usually two strong thorns arise at the base of the leaf, exstipulate, petiolate, alternate, trifoliate, each leaflet sessile, lanccolate, circinate.

INFLORESCENCE: Short lateral cymes.

FLOWERS: Pedicillate, bracteate, complete, actinomorphic, bisexual, hypogynous, greenish white in colour.

CALYX: Sepals 5, free, green deciduous.

COROLLA: Petals 5, free, imbricate, greenish white.

ANDROECIUM: Stamens many, free, filaments short, anthers linear, bithecous, dehiscence longitudinal, introse.

GYNOECIUM: Pentacarpellary, syncarpous, ovary superior, multilocular, due to the appearance of false septa. Ovule one in each locule placentation axile, style - single, short. Stigma - Simple, capitate.

FRUIT: A berry with hard rind, 4-6" in diameter, initially green but turns yellow when ripe.

SEED: Numerous, endorspermic, oblong flat testa densely clothed with thick fibrous hairs in a bright orange coloured sweet and aromatic pulp.

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Uses

General: The natives of Orissa and Bengal make a delicious and refrigerent sharbet from the ripe bel fruit, which they use largely in summer months. The village girls during the month of 'Vadrava', celebrate 'Khudurukuni' Puja. To give the idol glaze they use the mucilagenous fruit which is having some adhescive effect.

An essence is prepared from the entire half-ripe fruit (Dey, 1973).

Medicinal: Bael is regarded as an astringent due to tannin, pectin and the mucilaginous components contained in the jellylike mucous surrounding the seeds and to the astringent acids of the unripe fruit.

Bael is of an extraordinary medicinal value for patients with chronic dysentery and diarrhoea, and the patient is week and dyspeptic.

It is believed that Bael leaf chewed every morning after bath, reduces acidity, indigestion and increases the function of the liver.

For safe delivery of babies a piece of root kept in mouth is advised according to local customs.

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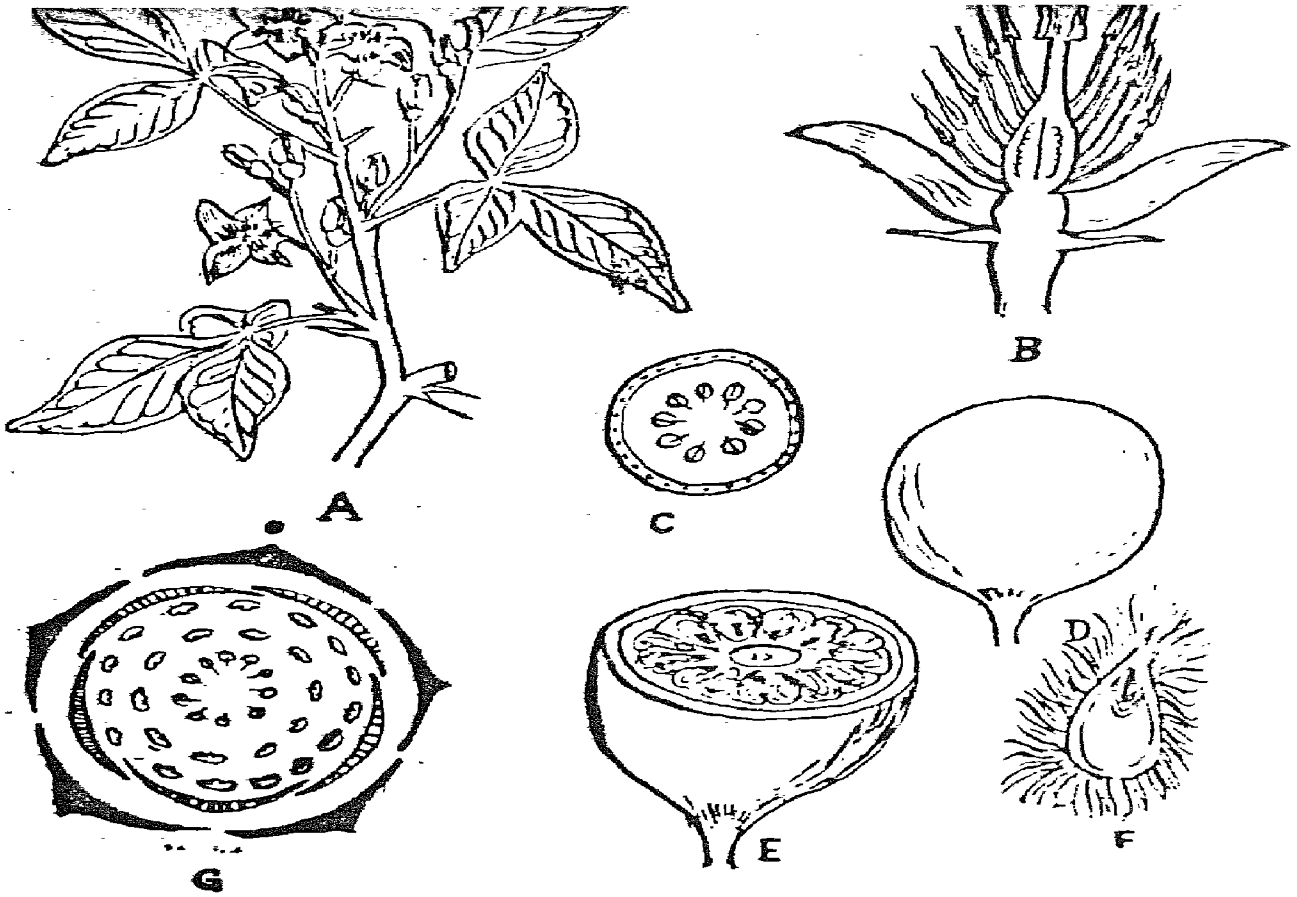

Fig-1. *Aegle marmelos* Linn. Corr. A– Flowering twig B– Flower in L.S C– T.S of ovary. D–A fruit E–T.S of fruit F–V.S of a seed. G–Floral diagram.

COCONUT PALM

(*Cocos nucifera*)

Popular name:

B - Naarikel, H. Narel, Nariyal
K - Jengu, Mal. - Jenga.
Mar-Narela, Ta - Jennai.
Te - Kobari

Unripe coconut fruit is an essential part of all Hindu religious ceremonies. Even in areas where the coconut palm does not grow, no puja or offering is complete - till a coconut is offered. If a son, a brother or a husband is going on a long journey, the mother, the sister or the wife applies tilak on his forehead, wishing him well and offers him a coconut. In South Indian temples, the priests will not accept the offerings of a devotee, if it does not contain a coconut. Similarly at weddings and other auspicious occasions coconut is placed at the pandal erected for the ceremony and at the gate way to the pandal. Because of the economic utility of coconut, which perhaps makes it essential in all sacred ceremonies. Usually a pitcher of water is placed on white - paddy; a branch of mango is placed in the pitcher and a coconut adorned with sandal paste, vermilion and flowers is placed on that branch. This is called the full pitcher - "Purnakumbha" which is symbolically invoked as gods and goddesses for the successful end to any mission undertaken.

The legend connected with the plants origin says Rishi Viswamitra practised severe austerities for a long time and in the end acquired super - human powers. To prove his prower, he decided to send kind Srisankar to heaven in his erthly mortal body. King Trisanker had been exited from his kingdom by his father for the reduction of the wife of a citizen. During the period of exile, there was a severe famine and Sri Sankar looked after the wife and children of Viswamitra while the latter was away. Since Sri - sankar desired to reach heaven in his mortal body, Viswamitra repaid him for looking after his family, by fulfilled his desire inspite of strong opposition from sages and gods. But when king Srisankar reached Indra's 'swarag' in his mortal body, Indra was furious; "How can a mortal reside in my domain in his mortal body? Only souls are permitted". Feeling annoyed at the audacity of Rishi Viswamitra, he harled the body of the king out of the heaven. When sage Viswamitra saw this happen, he was indignant. This very first effort was coming to naught, for the king's body to come back to earth would not only have meant insult but also an acceptance of defeat at the hands of Indra. So Rishi Viswamitra used super human powers again and stopped the kind from falling on the ground. This resulted in king

Trisankar being suspended in the air. To prop him, Viswamitra put a pole under him. In course of time, the pole became the coconut palm which is as straight and unbranched as the pole which Sage Viswamitra had taken to stop the further fall of the king. The reason for the coconut fruit to have coarse fibrous outer covering is because symbolically it resmbles the hair of the king and the two prominent black spots on the outside of the fruit resmble the two eyes of the king.

Coconut fruit is believed to fulfill one's desires. It is therefore considered sacred and offered to gods. The fruit is considered a symbol of siva as it has three black spots and Siva is believed to have three eyes. In Gujarat the bride offers a coconut to the bridegroom and this coconut is preserved by him throughout his life. In Mysore it is worshipped as a family God. Coconut is also worshipped as Saraswati, the goddess of learning.

Distribution & Origen

The coconut palm, a native of the Malayan and South Pacific regions, is naturalized widely in the Tropics and Subtropics, including peninsular Florida. Coconut palm is a "tropical jewel". It is difficult to ascertain where coconut palms originated. Sir Francis Drake encountered coconuts in the Cape Verde Islands surrounded by the Atlantic Ocean off the bulge of Africa during his visit there in 1577. He noted in his logbook that within the shell of the seed was"

a kind of substance very white no less good and sweet than almonds". Captain James Cook with the help of two naturalists in 1768 - 1771 reported coconut trees growing on most of the islands he visited in the South Pacific. The coconuts may have come from South America, floating and drifting to remote bits of land. It may have been brought eastward from Africa.

On many South Sea Islands tradition holds that coconut trees will grow well only where they can hear the sounds of the sea and the sounds of human voices. It is traditional, too, to plant a coconut tree when a baby is born and to judge the age of that individual according to the growth of the tree. The plants are largely grown near the sea-coasts, all over the Pacific and brought to India by sea-currents. This spreading of the coconut tree, moreover must have taken place many centuries ago making it difficult to keep record in the history.

Uses: There is sacrecely a tree in nature that gives us as many useful products as the coconut palm. The plants yield food both to man and animal. Food is secured from the pulpy, 'endospum' of the fruit and cooling drink from the 'milk', while the sape tapped from the flower spathe provides sweet drinks from which 'Neera' and toddy are made. The dried endospum is the 'copra' of commerce, yielding oil and cattle feed; the fallen immature fruits are glazed and marketed as

decoration pieces; the mesocarp of the fruit furnishes 'coir' which finds use in upholstery, saddles, brushes and rope making. The shell serves as a resonant backing for musical instruments and is also used as a hubble-bubble (hookah). The leaves made into mats and torches; the ribs of the leaflets are turned into ornamental combs, knitting needles, skewers and toothpicks. The wood is suitable for ridge-poles, spear handles, shingles. The green fruit contains a milky fluid which thersty people drink with pleasure and is known as 'coconut water' or 'coconut milk'. The tapped sap makes palm sugar and jaggery; The endosperm when dried yields an oil which is largely used as hair oil and cooking medium. It is also used for several other commercial purposes like soap making, margain etc. The drill is made into household articles. It is also leaves which are of very large size are woven into mats, baskets etc. The buds are used as vegetables and pickles. Wood is known as 'porcupine wood' and is used as rafters, decorating various articles. The root is astringent and is used in uterine diseases.

BOTANICAL ASPECT

Taxonomy:

Phylum - Angiospermeae
Subphylum - Monocotyledones
Division - Corolliferae
Order - Palmales
Family - Palmae or Palmaceae
Genus - Cocos
Species - Nucifora.

Habit & Habitat:

The majority plants grow in tropical and subtropical regions near the sea coast. Their fruits are fibrous and are able to float very long distance. Without under going any injury and hence they form the characterastic vegetation of sea-coast and sea islands.

The plants are mostly large unbranched trees or woody shrubs; marked with ring-like leaf scars.

Root:

Adventitious. The primary root soon dies and is replaced by adventitious roots arising from the base of the stem.

Stem:

The stem is unbranched, cylindrical, erect, filled with cullular tissue, which is traversed by strands of cloud fibro-vascular bundles. The stem may be covered with remnants of persistent leaf bases or leaf scars.

Phyllotaxy:

Alternate, crowded and restricted at the top of the columnar stem, giving a palm like appearance.

Leaf:

Large, compound, pinnatise of, leaflets, pemratisect, thick, leadhery, green in colour and shining, large with well-developed petiole and persistent base bread, amplexicaul and shealting plaited in bud, Rachis terminates into a small whip.

Inflorescence:

It is usually of large size and profusely branched. The branching of the inflorevence is of racemore type and compound spike. Each branch is enclosed by a fleshy spathe consisting of one or more leaves. Thus it is - spadix containing unisexual flowers, protected by a large petaloid bract or spathe.

Flower:

Small, sessile, regular, unisexual, actinomorphic, incomplete hypogynous.

Perianth:

Six in 2 whorls 3+3, free, tough, persistent, coriaceous, leathery or fleshy in consistence (outer whorl is smaller, thick and tough) often accuscent in fruit.

Androecium:

In male flower stamens are 6 in two whorls of 3 each, anthers are versatile, 2 lobed, dehiscing by verticle slits, pollens are produced in great quantity

and form clouds when discharged. The filaments are usually short, but quite distinct.

Gynoecium:

Female flowers - tricarpellary apocarpous, trilocular, axile placentation. Style is short. Two of the three carpels abort during the process of ripening of the fruit. The mature fruit therefore contains only one seed; although the three carpels are marked by the presence of three longitudinal cuts and also by the presence of three sound scars on the hard endocarp of the fruit.

Fruit:

It is a fibrous drupe, the size varies and floating in nature. It is differentiated into an epicarp consisting of a smooth but tough outer covering, a fibrous mesocarp and an endocarp (the shell) which is very hard and stony bearing at one end three eyes representing three carpels.

Seed:

Only one seed develops. On germination one of the three eyes develop into the embryo, with a brownish seed coat enclosing a white fleshy and oily endosperm. The endosperm contains a milky fluid. Dried endosperm is oily in nature.

Filoral formula -

Male flower - $P_3 + 3^{A}3 + 3^{G}\ ^{0}$

Female flower - ♀ $^{P}3 + 3\ ^{A}0\ ^{G}\ \underline{(3)}$

Floral formula. Fig 180, Page 483
Systematic Botany, R.K. Gupta.

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LIST OF PLANTS

	Acacia aicabila	
1.	Abroma angusta	
2.	Achyranthes aspena	
3.	Aegle elephantopsis	
	A. marmelos	
	Albizzia labbeck	
4.	Alstonia Scholaris	
	Anacardium occidentale	
5.	Anthocephallusa cadamba	
6.	Anona Squamosa	
7.	Andrographis paniculate	
8.	Areca catechu	M.S., D; F.D;
	Avena sativa	
9.	Butea monosperma	
10.	Artabotrys odoratissima	
11.	Barleria Cristala	M.S. D, F.D;
12.	Boerrhaavia diffusa	O.H; M.S.
13.	Basella alba	N.B, D, F.D.
	Borassm flivellter	
14.	Canabis sativa	O.H; M.S; D, F.D.
	Capsicum frutescence	R.C.E.
15.	Cassiapocidentale	M.S; O.H; ?
16.	Cassia sophera	M.S; C.H. ?
17.	Cassia tora	M.S; O.H ?
18.	Cleome viscosa	M.S.
19.	Clitoria terratea	D, F.D.?
20.	Clerodendron infortunatum	
21.	Corchorus capsulares	
22.	Corchorus oletorius	D; F.D; M.S;

	Cetricularia stellacia	
23.	Creataera religiosa	M.S; D.F.D;
24.	Croton sparsiflorus	M.S. O, H; ?
25.	Crinum asiaticum	M.S., O.H.?
26.	Cucurbita marema	M.S.
27.	Ducos carota	
28.	Dature fastuosa	
29.	Dillenia indica	
30.	Emblica officinalis	
31.	Elaeacarpus geuitorus	
32.	Enhydra fluectuance	
33.	Erythrine indice	
34.	Euphorbia autiquorum	
35.	Gryeomis pentaphylla	
36.	Gossypium herbaceum	
37.	Gynandropsis gynandra	
38.	Hordeum vulgare	
	Hydrilla Verticillata	
39.	Hydrocotyl asiatica	
	Impatiens balsamia	
40.	Ixora coccinea	
41.	Jatropha curcus	
42.	Malachra capitala	
43.	Malva verticillata	
44.	Mimosa Pudica	
45.	Mimosops elingii	
	Morus indica	
46.	Musa sapientum	
47.	Nigella sativa	
48.	Nicotiana tabacum	

	Oryza sativa	
49.	Oxalis corniculata	
	Oldenlandia corymbosa	R.C.E.
50.	Passiflora foetida	M.S.
	Pandanum	N.K.
51.	Piper longum	M.S.D, F.D;
52.	Pistia	O.H? M.S.D, F.D;?
	Pisum sativum	F.C.E.
53.	Pleumeria	O.H;? M.S, F.D;?
54.	Polyalthia longifolia	.M.S, D, F.D.
55.	Polygonum orientalae	M.S.
56.	Pothos scandens	O.H; ? S.D, F.D;
57.	Pouzolzia indica	O.H.; ? M.S;
58.	Premna integrifolia	M.S.; D, F.D;
	Psidium guajava	
59.	Quisqualis indica	M.S. complete
60.	Rauwlfia serpentina	M.S; D. F.D.
61.	Ricinus communis	M.S;
62.	Rumex macilimus	O.G;? M.S; D.F.D.
63.	Saraca indica	O.H.? F.D.
64.	Scirpus grossus	O.H; ? M.S; D.F.D;
	Sesamum indicum	
65.	Smithia sensitiva	O.H;? M.S; D; F.D.
	Solanum nigrum	R.C.E.
66.	*Sorghum vulgare*	O.U.A.T.
	Theretia nerifolia	M.S; D; F.D;
67.	Trema orientalae	O.H.? D; F.D.
	Tapioca sp.	O.U.A.T.
68.	Trewia nudiflora	D; F.D;

	Typha angusta	
69.	Triumfelta rhomboideo	O.H; ? D,F.D.
70.	Tylophora indica	F.D; D; M.S;
71.	Vanda roxburgii	M.S;
72.	Vitis quadrangularis	O.H; ?
73.	Vigna catiang	M.S; D; F.D;
74.	Watharia sorevifera	D; F.D; ?

LIST OF HERBARIUM

1. *Anthocephallus cadamba*
2. *Achyranthes aspera*
3. *Amaranthus spinosus*
4. *Argemon mexicana*
5. *Artabotrys odoratissima*
6. *Boerrhaavia diffusa*
7. *Bauhinia acuminata*
8. *Buchanania latifolia*
9. *Cassia sophera*
10. *Cassia tora*
11. *Cleome viscosa*
12. *Clitoria ternatea*
13. *Cinnamomum tamala*

13.1 *Combretum decandrum*

13.2 *Celsia coromandeliana*

13.3 *Commelina benghalensis*

13.4 *Colocasia antiquorum*

14. *Crinum asiaticum*
15. *Croton sparsiflorus*
16. *Cyperus rotundus*
17. *Datura fastuosa*
18. *Desmodium gangeticum*
19. *Eugenia jambolina*

19.1 *Eusinta reflexa*

19.2 *Eleusine indica*

19.3 *Euphorbia hirta*

20. *Glycosmis pentaphylla*
21. *Gomphrena globosa*

21.1 *Guazuma tomentosa*

22. *Gynandropsis pentaphylla* (Gyanudra)
23. *Heliotropium indicum*
24. *Lonidium suffruticosum*
24.1 *Ixora coccinea*
25. *Jatropha curcus*
26. *Jodalia culecate*
26.1 *Joremia fourmieria*
27. *Lantana camara*
28. *Leonurus sibiricus*
29. *Mikania scandens*
30. *Mimosa pudica*
31. *Mimusops elengii*
32. *Pedilanthes tithymaloides*
33. *Peperomia pellucida*
34. *Passiflora foetida*
35. *Pleumeria acutifolia*
35.1 *Polygonum orientatai*
35.2 *Pouzolzia indica*
36. *Pterospermum acerifolium*
37. *Quamoclit pinnata*
38. *Rauwolfia serpentina*
39. *Saraca indica*
40. *Schleichera trijuga*
41. *Sesamum indicum*
42. *Sida rhomboides*
43. *Sermendalia leclerica*
44. *Solanum nigrum*
45. *Solanum xanthocarpum*

46. Therelia nerifolia

47. Todulia aculite

48. Tylophora indica

49. Trema orientatae

50 Zetricularia graminifolia

পলাশ

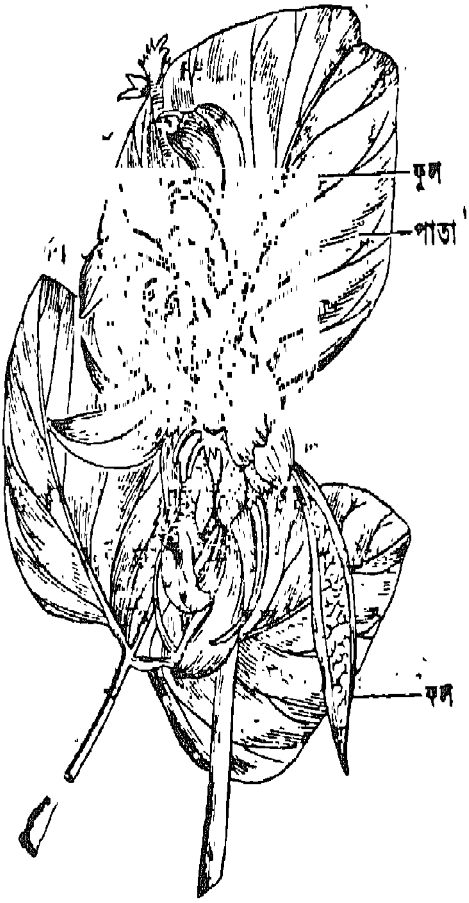
শ্রীমতী কুন্তলা বসু
রিসার্চ এসিস্ট্যান্ট
ডাঃ শ্রীমতী গৌরী রাণী ঘোষ
—প্রজেক্ট ডিরেক্টর এরিক স্কীম N.C.E.R.T
ডাঃ শ্রীমতী মাধুরী রায়
—ইনভেসটিগেটর

শ্রেণী—ডাইকটিলিডন
উপশ্রেণী—পলিপেটালি
সিরিজ—ডিসকিফ্লোরি
কোহট্—রেসালিস
বর্গ—লেজুমিনসি
(Order)
গণ—বিউটিয়া (Butea)
প্রজাতি (Species)—মনোস্পারমা (বেনথাম হুকারের মতে (Monosperma) শ্রেণীবিভাগ)

বাংলা—পলাশ, হিন্দী, টেসু, সংস্কৃত কিংশুক, ইংরাজী - ফ্লেম অফ দি ফরেষ্ট।

পলাশ গাছ হিন্দু ও বৌদ্ধদের কাছে খুবই পবিত্র গাছ। হিন্দুরা এই গাছকে ব্রহ্মা বলে মনে করেন কারণ তাঁদের মতে, পার্ব্বতীর অভিশাপে ব্রহ্মা পলাশ গাছে পরিণত হন। এই পলাশ নামটি থেকেই পলাশীর যুদ্ধ কথাটি এসেছে, যে পলাশীর যুদ্ধে লর্ড ক্লাইভ সিরাজকে পরাজিত করে বাংলা জয় করেন। পণ্ডিতগণের মতে এর নাম যে পলাশ তার কারণ পল মানে হল গতি, এই গতির সঙ্গে সঙ্গেই যার বিয়োগ পল+অশ । পলাশের ত্রিফলক (Trifoliate) পাতাকে হিন্দুরা তিন দেবতার সঙ্গে তুলনা করেন। মাঝের পাতাটিকে বলা হয় রক্ষাকর্তা বিষ্ণু, বাঁদিকের পাতাটিকে বলা হয় সৃষ্টিকর্তা ব্রহ্মা এবং ডানদিকের পাতাটিকে বলা হয় শিব। চণ্ডীমঙ্গল কাব্যে পলাশের সম্বন্ধে এক ছোট গল্প আছে—দেবরাজ ইন্দ্র প্রতিদিন বিভিন্ন রকমের ফুল দিয়ে শিবপূজা করতেন। তাঁর পুত্র নীলাম্বর এই সমস্ত ফুল তুলে আনতেন। দেবী চণ্ডীর ইচ্ছে হলো নীলাম্বরকে দিয়ে তার পূজা মর্ত্তে প্রচার করেন। তিনি একদিন সমস্ত গাছকে ফুলহীন করে দিলেন এবং নিজে একটি পলাশ ফুলের মধ্যে পিঁপড়ে হয়ে লুকিয়ে রইলেন। নীলাম্বর সারা জঙ্গল খুঁজে কোন ফুল না পেয়ে, ক্লান্ত হয়ে কয়েকটি পলাশ ফুল নিয়ে বাড়ী ফিরলেন। ইন্দ্র সেই ফুল দিয়েই পূজা করলেন, তখন তখন পিঁপড়েটি

শিবের কানের মধ্যে ঢুকে গেল। শিব অত্যন্ত রেগে গিয়ে নীলাম্বরকে অভিশাপ দিলেন। শিবের অভিশাপে নীলাম্বরকে ব্যাধ হয়ে মর্ত্তে জন্মাতে হোল। সেই ব্যাধ কালকেতুই মর্ত্তে চণ্ডীর পূজার প্রচার করেন কবিরাও পলাশকে নিয়ে তাঁদের কাব্য রচনা করেছেন। কবি আমীর খসরু পলাশের রক্ত লাল ফুলকে সিংহের রক্তাক্ত থাবার সঙ্গে তুলনা করেছেন। বাংলা, বিহার, ছোটনাগপুর ইত্যাদি অঞ্চলে এই গাছ দেখতে পাওয়া যায়।



পলাশ

পলাশ একটি পর্ণমোচী (deciduous) বৃক্ষ। এর কাণ্ডের গোড়ার দিকটা ফাটা ফাটা কিন্তু শাখা প্রশাখাগুলি মসৃণ। ফাল্গুনে গাছের পাতা পড়ে যায় এবং কুঁড়ি ধরে। কুঁড়িগুলি বাঘের নখের মতন দেখতে। চৈত্র মাসে ফুল ধরে তখন গাছের উপরটা ফুলে লাল হয়ে যায় এবং দূর থেকে দেখলে মনে হয় আগুন লেগেছে। ফুলের কোন গন্ধ নেই কিন্তু এর উজ্জ্বল রং এবং মধুর জন্য পাখিরা এসে ভীড় করে। বর্ষাকালে পাতা গজায়। পাতাগুলি ত্রিফলক (Trifoliate) মূল বৃন্তে তিনটি করিয়া পাতা থাকে। ফলগুলি অনেকটা সিমের মত দেখতে। চার রকমের পলাশ ফুল আছে। সাদা রংয়ের ফুল সাধারণত দেখা যায় না, গাঢ় লাল রংয়ের ফুলও সহজে চোখে পড়ে না, হলুদ রংয়ের ফুল খুব কম দেখা যায়, লালচে কমলালেবু রংয়ের পলাশ ফুলই বেশী দেখা যায়।

বৈজ্ঞানিক পরিচিতি

(BOATNICAL DESCRIPTION)

উদ্ভিদ—পর্ণমোচী বৃক্ষ, কাণ্ড ফাটা ফাটা, শাখা প্রশাখা মসৃণ।

পাতা—ত্রি-ফলক (Trifoliate), ফলকগুলি বড় চকচকে, উপপত্র (stipules) ছোট—আশুপাতি (caducous) মাঝখানের ফলকটি বড় এবং বিডিম্বাকার (obovate) এবং পাশের ফলকগুলি ছোট

পুষ্পবিন্যাস (Inforescence—কাক্ষিক (Axillary) অথবা অগ্রস্থ (Terminal) অনিয়মিত (Receme) পুষ্পবিন্যাস।

ফুল—বড়, লালরং খুব ঘনভাবে সাজানো থাকে।

বৃতি (calyx)—বৃত্যংশ (sepal) ৫, কোণেই এবং ঘণ্টাকার (companulate) বাদামী রং, ভেলভেটের মতো।

দলমণ্ডল (crolla)—পাপড়ি (Petal) লালচে কমলালেবু রংয়ের পাঁচটি, ধ্বজা (standard) ডিম্বাকার (Ovate) সূক্ষ্মাগ্র (Acute),

পক্ষ (wings)—বাধান তরীদলের (keel) সঙ্গ যুক্ত থাকে।

পুংস্তবক (Androcclum)—পুংকেশর (Stamen) দশটি, পুংদণ্ড (filanen) মুক্ত, পরাগধানী (Anther) একই রকম।

স্ত্রীস্তবক (Gynecium)—গর্ভকোষ অবৃন্তক (Sessile), দুটি ডিম্বক (Ovule) যুক্ত। গর্ভদণ্ড (Style) লম্বা, বাঁকানো, গর্ভমুণ্ড (Stigma) শীর্ষস্থ (terminal),

ফল—শিম্ব (Pod) জাতীয়, ৫/২০ সেমি, লম্বা লোমযুক্ত, ঝুলন্ত (Pendulous) অবিদারী (Indehiscent) একটী বীজ যুক্ত।

বীজ—বিডিম্বাকার (Oborate), চ্যাপ্টা, ডিম্বকনাভী (Hilum) ছোট ফুলের সংকেত (Floral Formula) $K_5\ C_{1\,2}\ A_{10}\ G_1$

(১) কাঠ—জলে না ডোবালে এই কাঠ শক্ত হয় না। এই কাঠ দিয়ে প্যাকিং কেস শস্তা বোর্ড হিসাবে, বাড়ী তৈয়ার করার কাট হিসাবে ব্যবহৃত হয়। এর কাঠকয়লা বারুদে ব্যবহার করা হয়।

(২) আঠা - পলাশ গাছের গুঁড়ি থেকে একরকমের আঠা বের হয়। তাকে 'বেঙ্গল কিনো' (Bengal kino) বলা হয়। এটা পশুর চামড়া পাকা (Tan) করতে এবং রং করতে ব্যবহার করা হয়। এই আঠা থেকে একরকমের নীল রং পাওয়া যায়। এই আঠার মধ্যে ট্যানিস (Tannis) এবং (Gallic) অ্যাসিড থাকে।

(৩) তন্তু (Fibre)—গাছের গুঁড়ির ভিতরে ছা'ল থেকে একরকমের শক্ত তন্তু পাওয়া যায়। এই তন্তু কাগজ, দড়ি ইত্যাদি তৈয়ার করতে ব্যবহার হয়।

(৪) রঙ—ফুলের থেকে একরকম উজ্জ্বল, হলুদ, রং পাওয়া যায়। এই রং দিয়ে কাপড়, উলের কার্পেট, সোনার জিনিষ রং করা হয়। দোলের সময় আমরা যে আবীর ব্যবহার করি তার মধ্যেও এই রং থাকে।

(৫) আদিবাসীরা পলাশ গাছের পাতা সেলাই করে বা গেঁথে খাবার থালা হিসাবে ব্যবহার করে।

ঔষধার্থে ব্যবহার—গাছের ছাল, আঠা, পাতা ফুল, বীজ ইত্যাদি ঔষধার্থে ব্যবহার হয়।

গাছের ছালের রস সর্দি, কফ ইত্যাদিতে দেওয়া হয়। ছালের টুকরা চিনির সঙ্গে চিবোলে তৃষ্ণা দূর হয়। যে কোন রকমের ক্রিমির উপদ্রব কমাতে পলাশ গাছের ছালের রস জলের সঙ্গে মিশিয়ে খেতে হয়।

পলাশ গাছের আঠা ঘায়ে এবং বিশেষতঃ গলার ঘায়ে লাগানো হয়। শূল বেদনায় (colic pain) পলাশ গাছের আঠা পেস্টের মত তলপেটে লাগানো হয়।

পলাশ পাতার রস, উদারময়, আমাশয়, অর্শ, নিশাঘর্ম, ক্রিমির জন্য, পেটব্যাথায়, লাবণ্যরক্ষায় বিশেষ উপকার দেয়। বীরভূম ও বাঁকুড়া জেলার আদিবাসীরা এখনও বীর্যবান পুত্র লাভের জন্য পলাশ পাতা বেঁটে শরবৎ করে খেয়ে থাকে।

পলাশেরর বীজ গুঁড়ো করে দূষিত ঘা সারাতে লাগানো হয় মধুর সঙ্গে বীজের খণ্ড করে ক্রিমির জন্য খাওয়া হয়।

যে কোন রকম বিছেয় কামড়ালে পলাশের বীজকে আঠায় বেঁটে জ্বালা যন্ত্রণা দূর হয়। এটা সাঁওতাল পরগণার একটা টোটকা।

ধর্মগত ব্যবহার (Sacraduse —

উপনয়ন সংস্কার অর্থাৎ পৈতে হওয়ার সময় এবং নবগ্রহের হোম করার সময় পলাশের সমিধের প্রয়োজন।

আঁতুর ঘরের (সুতিকাগৃহ) ভূতাপসারণের জন্য ষষ্ঠীপূজার সময় পলাশ পাতার প্রয়োজন।

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Know the Plants.....

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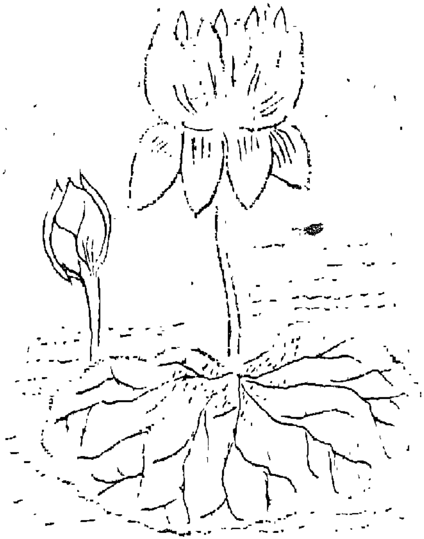

Visuals and Presentation
by

GOURI B. GHOSH and SURAJ JOSHI
DESM

Victoria regia

Victoria regia, a magnificant water lily, of gigantic size, is found in tropical northern South America, frequently covering the water surface for miles.

V. regia was first observed by Thaddacus Haenke in Bolivia in 1801 but he died in philippines without recording the discovery. It was rediscovered by Eduard Priedrich Poepping around 1930/32 in the Amazon and was named – E. amazonum. Plants of the genus Victoria were subsequently found in many rivers of the northern and eastern part of South America and as far south as paraguay.

It was introduced with great difficulty to horticulture. Some seeds more sent to England from Georgetown, British Guiana, in a bottle of mud water; by Bridgas in 1846 with the instruction that they must be kept constantly wet to remain viable. The first flower that bloomed in England was presented to queen Victoria, in honour of whom the genus was renamed. It is this Northern species, therefore, which boars the name VICTORIA REGIA.

The first flower bloomed in Nov.9, 1849, at Chatsworth, England, the seat of the Duke of Devonshire. By Nov. 9, 1850, this plant had produced 126 flowers.

The Indians of British Guiana called it the "water-platter", refering to its remarkable floating leaves, which are six feet or more in diameter and are circular with an upturned rim four inches.

to six inches high. These gigantic leaves, which are of a purplish-green colour on the under side, are orbicular peltate; they have a sort of wickerwork of very prominent prickly veins underneath, and are borne on petioles longer than the depth of the water on which they float - an apparent provision against submersion by changes in the river level. The leaf tissue s are full of air spaces and canals, which render the leaves bouyant inorder to support weights from 100 lbs to 200 lbs. The leaf is porous, to keep the rimmed upper surface moist.

The flowers resemble common water lilies and are more than a foot in diameter. They are necturnal and open on two successive evenings. The first time a flower blooms the inner petals over the stigma remain unexpanded and the flowers are creamy white with a mellow fragrance. It closes the next forenoon, to open again at dark, this time expanding to its maximum, and changes to rose-red. The flower then closes and is withdrawn beneath the surface of the water.

The seeds are like peas hidden in the cells of an inforior globular prickly capsule, as large as a coconut.

The seess are full of starch and are used as food by the natives of South America. The fruit is called - "Water Corn".

"KADAMBA"

(*Anthocephalus cadamba*)

It is a common tree of our forest with gigantic stature. It is a very fast growing tree. During the first two or three years the rate of growth is about 10ft a year. The simple leaves with their stipules are borne in opposite pairs. The small orange coloured fragrant flowers are borne in large and very attractive balls.

As it grows wild in our forests the tree is closely associated with our Krishna-Radha legend Krishna used to dance with Radha and the Gopies under this tree in the full - moon night of "Sravan".

In "Garuda Purana" it is mentioned that on the occasion of "Anangatryodoshi", which falls on the 13th day of moon's increase in the month of January, Yogeswar "Siva" should be worshiped with offerings of the twigs of Kadamba.

The Banyan Tree

Ficus benghalensis

Banyan, a member of one of the big tree families, can grow into a venerable old age with a spreading evergreen crown supported by numerous pillar roots, looking like a vaulted canopy. From the spreading side branches hang clumps of brown aerial roots that eventually unite and on reaching the ground take root and grow into separate pillars, supporting the crown.

In very old trees the original main tree slowly disintegrates leavingbehind the crown entirely supported by the older trunk like root pillars. This is what exactly has happened with the famous Great Banyan Tree in the Indian Botanical Garden at Sibpur, Howrah, West Bengal. It has a vast crown, more than 404 meters in circumference and well supported by more than a 1,200 aerial root pillars.

In our country the roads are lined with Banyan trees for giving shade and to check soil-erosion and air pollution. Pollination in Banyan like other figs is very interesting. It appears to bear no flowers, but only fruits. Actually what looks like a fruit is a fleshy cup concealing numerous minute flowers of both sexes, commonly referred to as the 'fig'.

These stalkless figs grow in pair in leaf axes (angles). They contain certain minute flowers inside and also a host

of minute insects and wasps. A particular species of wasp is specific to the Banyan and is indispensable for its reproduction. The wasp can not live without the fig, and the fig tree cannot produce seeds without the wasp. The insects enter through a hole in the top of the fig and lay eggs on some of the flowers which are known as the gall-flowers.

The eggs hatch and mature into new insects which on leaving their home get dusted with pollens from the male flowers. The insects now make their way into another fig and repeat the process. The characteristic association between the two is interesting.

Figs of the Banyan become bright red when they ripen and are much sought after by birds and bats which also accounts for the dispersal of the seeds by them. The Banyan tree with its bright green leaves and new fruits become the safest shelter for birds like parrots who have green feathers and red beaks.

The Banyan is held sacred by the Hindus and hence is not usually cut by them. It is sacred to Vishnu. Because of its longivity and the nature of dropping roots from its branches, the tree is considered immortal. Narayan sucking his toe (a symbol of eternity) is represented as lying on a *Vat* (Banyan leaf).

'Ficus' is the Latin word for 'Figs' and 'benghalensis' refers to Bengal. The Banyan is widely planted through out the hills and plains of India.

The name 'Banyan'tree' was given by Europians to a particular tree of this species under which Baniyas (Hindu members of the merchant class) used to assemble for worship and business.

The Royal Water Lily—Victoria-regia

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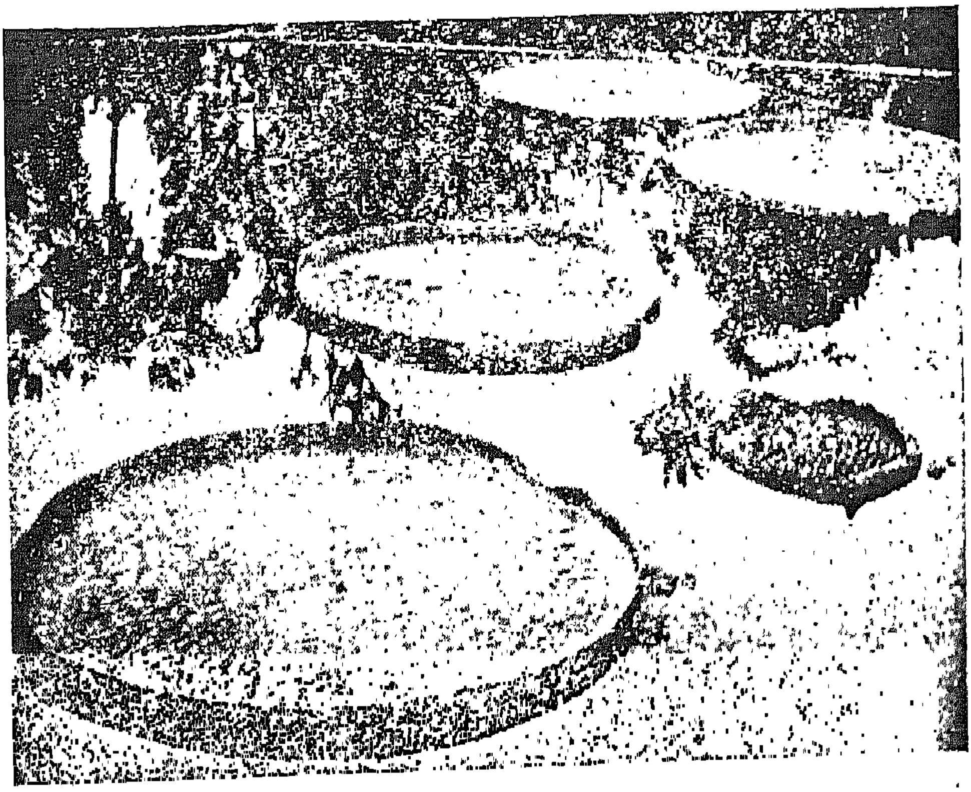
VICTORIA-REGIA, a magnificent water lily of gigantic size, is found in its natural state in the tropical South America, frequently covering the still water surface for miles. The natives of British Guinea called it the "Water-Platter", referring to its remarkable floating leaves. These leaves are six feet or more in diameter and are circular with an upturned rim 3 to 8 inches high making a basin-like platform which can even provide a circular bed for a full-grown human.

The gigantic leaves are orbicular, peltate of a purplish-green colour on the under side, and have a sort of wicke work of very prominent prickly viens. They are borne on petioles longer than the depth of the water on which they float, obviously this is a provision against submersion by changes in the water level.

The leaf is perforated with fine holes and were called "Stomatodes" by the French botanist, Jules E. Planchon. He



considered them useful as air-holes, to let out gases which rise from the water or mud. Inspite of the basin-like form of the leaves, rain-water or water from other sources do not remain on the surface, for it percolates down through these tiny perforations. This is an indispensable protection against fungi and algae, and for the function of assimilation.

The leaf tissues are full of air spaces and canals which render the leaves bouyant in order to support weights from 100 lbs to 200 lbs.

The flowers resemble the common water-lilies, and are more than a foot in diameter. They are nocturnal and open on two successive evenings. The first time a flower blooms the inner-petals over the stigma remain unexpanded and the flowers are creamy-white in colour with a mellow fragrance—somewhat like a pineapple. It closes the next forenoon to open again at dark this time expanding to its maximum, and changes to rose-red in colour. The flower then closes and is withdrawn beneath the surface of the water.

The plant *V. regia* belongs to the sub-family NYMPHAEOIDEAE, family NYMPHAECEAE under order : RANALES. class : THALAMIFLORAE, group : POLYPETALAE, and Division, DICOTYLEDONS.

The seeds are elliptic-globose and are 3 inches long and 2½ inches in diametre, like the peas hidden in the cells of an inferior gloubular prickly capsule like a coconut.

The seeds are called "Mais del Agua" i e.—"Water Corn", by the inhabitants Paraguay, South America, as the seeds are full of starch and are used by them as food.

Victoria-regia was first observed by the Bohemian explorer and botanist Thaddeeus Haenke in Bolivia in 1801 but he died without recording the discovery.

Amie J.A. Bonpland the French explorer saw it near Corrientes, Argentina in 1819 and in 1825 sent seeds and a full description to Mirbel in Paris.

Alcide D. Orbigny the French Naturalist also sited a similar plant in Corrientes in 1827. He sent drawings of the plant with specimens to the

Museum of Natural History in Paris. He again saw it in 1933 in Bolivia and several years later published accounts of his find. And it was named V. Cruziana in honour of General Santacruz of Bolivia.

In 1832, Poepping found it in the Amazon and first published an account of it in Froriep's 'Notizen' in November, 1932. Poepping named this plant *Euryale amazonica.*

The northern species of the plant was found by Robert H. Schomburgk, the German naturalist, in 1836 on the Berbice river in British Guiana. He sent specimens and sketches to Lindley, the English botanist, in 1837, and the report was published in 1838 establishing the genus *Victoria* and the species *Victoria-regia.*

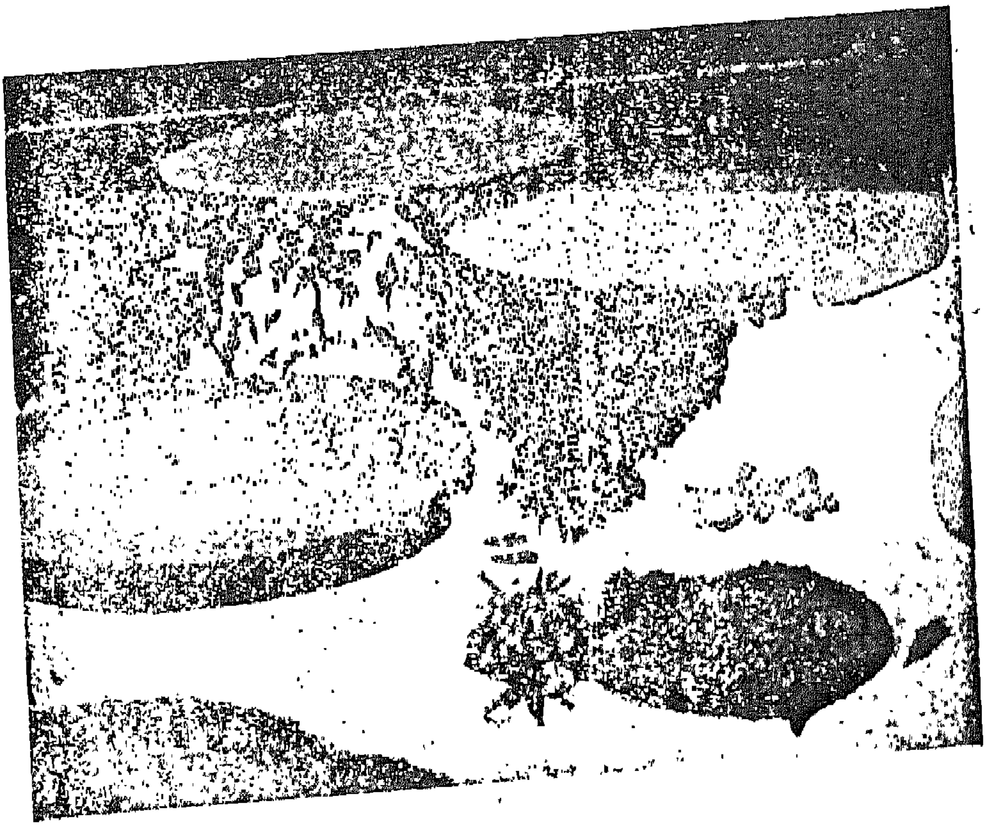
Plants of this genus were subsequently found in many rivers of the northern and eastern part of South America and as far south as Paraguay.

With great difficulty this 'Queen of Water-Lillies' was captivated and introduced to Horticulture.

From the beginning, efforts were made to grow this plant in Europe. Living plants in jars of water with wet clay, and dry seeds with rhizomes were sent to Europe. But the rhizomes rotted during the journey and the seeds refused to germinate. Expeditions brought living plants to Europe but all of them died.

Finally, two English physicians, Luekie and Rodie, sent some seeds to Kew, from the Demerana River, in bottles of fresh water. The seeds reached England on February 28, 1849 and on November 8, 1849 one of the plants flowered.

This flower was appropriatly presented



to Queen Victoria—who was reigning England at that time. From this stock *Victoria-regia* was distributed to gardens in Europe, Asia and America.

In India, specimens of this remarkable plant can be seen in the Botanical Gardens of Sibpur, Howrah, West Bengal.

(*Photo* : *S. Joshi*)

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